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I. INTRODUCTION

THE PROVISION of air services to geographically remote areas can be critical for their economic growth. Small states with comparatively smaller economies often suffer from a lack of air-service provision as a consequence of their size.[1] Insufficient domestic capital can restrain profitable operations by a national carrier, and the states' small geographic and economic size may result in less economic activity and, by extension, demand for air-service access.[2] As a result, international access to small states often falls to foreign airlines who understandably seek positive returns from passenger traffic and cargo operations. Paradoxically, such services are somewhat tenuous in that their ability to generate positive yields can be limited as a result of

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[1] Andreas Antonio, *The Air Transportation Policy of Small States: Meeting the Challenges of Globalization*, 6 J. AIR TRANSP. WORLD WIDE 65, 79 (2001).

[2] *Id.* at 82.

serving thin markets and thin routes.[3] Small origin-market size and significantly smaller (comparatively) demand for destination traffic can impede revenue, yield, and, ultimately, EBITDAR[4] margins. Volatile economic conditions—notably periods of significant demand slump, such as the global economic crisis of 2008 and 2009—can further hamper profitable performance in markets where foreign carriers operate to remote destinations.

Not surprisingly, then, those states separated from key source markets by large distances (both physical and network) may have economically valid reasons for ensuring that air-transport accessibility is maintained. This is especially the case when valuable foreign exchange earnings from visitors are at risk. A strategic policy question for these instances therefore becomes what levers are available for remote destinations to attract and maintain sufficient air services for the benefit of trade in goods and services?

The purpose of this article is to review the conditions that may lead to an operational cost-share agreement between a state and a foreign commercial airline. A related purpose is to review the resulting implications for wider government-based policies relating to connectivity in instances where demand for access is low. Attention is directed toward thin-market policy options for remote states. Thin markets are revealed when (a) demand for travel to a destination is limited due to relative utility achieved through substitutes, (b) supply-side variables such as geographic size (e.g., small islands) and development barriers limit economies of scale, or both. We argue that cost-share agreements may be efficient when existing market demand is insufficient for a foreign airline to continue service without subsidization and that the resulting arrangement may have critical implications for future market development as well as general stated policies on trade in goods and services.

The article begins with a brief review of the economic geography of connectivity and accessibility in the context of destination prosperity and development potential. This is followed by a discussion of the elementary economics of air-service subsidies with the focus on different approaches to subsidies that can be lev-

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[3] James Nolan, Pamela Ritchie, and John Rowcroft, *Small Market Service and Regional Policy*, 39 J. TRANSP. ECON. & POL'Y 363, 364 (2005).

[4] EBITDAR is Earnings Before Interest, Taxes, Depreciation, Amortization, and Rent.

ied. A case study of the Cook Islands in the South Pacific is then presented as an example of the union of both issues, demonstrating that the policy dimensions of optimal choice *ex ante* for autochthonous states is that which minimizes loss *ex post.* After considering the implications for these types of cost-share arrangements on access policy and strategy, some future prospects for such agreements are discussed in the conclusion.

II. CONNECTIVITY AND ACCESSIBILITY: THE ANTECEDENTS OF COST SHARING

A brief review of the importance of connectivity and accessibility demonstrates the value of cost-sharing arrangements. The context within which air-service subsidization becomes a policy option is not only embedded within a state's political and economic ties to wider streams of trade and commerce but also within its relative measure of geographic accessibility and connectivity. We are here less interested in connectivity as a measurable tool for maximizing efficient capital allocation across a network,[5] but more in the concept of connectivity as a mechanism that leads to conclusions regarding general economic development, both actual and potential. Doing so puts transport access—particularly air access—firmly within the scope of government policy. Transport connectivity and accessibility are critical for economic balance and sustainability; the health of a state's economy can be linked to the extent to which it is connected, and thus integrated, within a network.[6] With respect to tourism-development potential, access and connectivity can be just as critical as marketing efforts or product development.[7]

Geographic analyses of accessibility consider variables such as the number of nodes and their spatial dispersion, although under a gravity model, the size of particular nodes can also factor into the relative demand for access.[8] Small or more remote nodes, then, are at a relative geographical disadvantage. This

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[5] *See* Guillaume Burghouwt et al., *Air Network Performance and Hub Competitive Position: Evaluation of Primary Airports in East and South-East Asia,* 3 AIRPORT MGMT. 384, 386 (2009).

[6] *See* David Banister & Yossi Berechman, *Transport Investment and the Promotion of Economic Growth,* 9 J. TRANSP. GEOGRAPHY 209, 209–10 (2001).

[7] *See* Andreas Papatheodorou, *Civil Aviation Regimes and Leisure Tourism in Europe,* 8 J. AIR TRANSP. MGMT. 381, 385–87 (2002).

[8] Darren M. Scott et al., *Network Robustness Index: A New Method for Identifying Critical Links and Evaluating the Performance of Transportation Networks,* 14 J. TRANSP. GEOGRAPHY 215, 218–21 (2006).

can have significant implications for the provision of commercial-transport services to those destinations. The economic viability of a network of nodes and their related interconnects can be derived from the demand for interaction across multiple node pairings. Thus, traditional[9] geographic measures of networks include gamma calculations, e.g., $\gamma = e/e_{max}$, where e is the number of links in a network.[10] Such models can assist network planning by assessing demand through Newtonian-based gravity considerations but may not necessarily account for market variances and features.[11]

The International Air Transport Association (IATA) noted that connectivity has a net positive impact on productivity and can have important implications for policy—notably a conscious attempt at liberalization or a continuance, depending on existing degrees of liberalization—the degree of competitiveness in the market, and the extent to which aviation contributes to economic growth.[12] A connectivity model developed by IATA features Chicago O'Hare and London Heathrow as the most connected because of their relative connectivity to other highly connected destinations.[13] Where this discussion becomes pertinent to the concept of cost sharing is the extent to which connectivity has an impact on remote destinations that are not connected nearly as well. This can be explained in many ways, although it is likely that weak demand as a consequence of small-market access is perhaps most indicative.

III. THE ECONOMICS OF AIR-SERVICE SUBSIDIES

While the term "cost share" is used here more or less as a concept derived from the public-policy literature, it is acknowledged that a more accurate commercial description follows typical economic definitions of a direct subsidy. For our purposes, a subsidy is any financial instrument put in place by a government or public body to directly benefit a domestic or foreign private

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[9] Studies from the 1950s and 1960s in the spatial geography literature sought to utilize interaction and graph theory to understand flows. Such studies have since given way to quantitatively advanced methods in geography, such as GIS mapping, and advanced econometrics. Nonetheless, these still serve as a useful basis for understanding the principles of traffic flows.

[10] Scott et al., *supra* note 8, at 219.

[11] *See* I.G. Heggie, *Are Gravity and Interactuance Models a Valid Technique for Planning Regional Transport Facilities?*, 20 OPERATIONAL RES. 93, 93–108 (1969).

[12] Mark Smyth & Brian Pearce, *IATA Economics Briefing No. 8: Aviation Economics Benefits*, IATA (2007).

[13] *Id.*

firm for the purpose of assisting production.[14] Subsidies are often implemented to protect infant industries or to secure domestic production of a good or service within unbalanced markets and, thus, can be designed to correct market failure, often in lack-of-output form.[15] Criticisms of subsidies generally relate to the resulting artificial distortion of markets.[16]

The use of subsidies as a policy lever, especially surrounding implementation and legal ramifications, were the subject of global-trade negotiations leading up to the Geneva round of General Agreement on Tariffs and Trade (GATT) negotiations in 1947.[17] Since then, however, precise definitions have not achieved substantive international agreement. As the Uruguay Round of GATT did not clarify the subject definitively, the definition of a subsidy and the extent to which subsidies are used and justified globally on various goods and services remains variable.[18]

A. Subsidy Variants in Air-Service Provision

Subsidization in air-service provision can occur at varying levels.[19] First, and from a regulatory perspective, states may hold majority shareholding in a provider either out of necessity, as a result of a recapitalization effort, or as a means of ensuring that iconic "flag" status is maintained. Further, a state may restrict seventh or fifth freedom air rights in an effort to protect the routes of a national carrier.[20] Specific routes may be protected through the awarding of monopoly rights to a specific carrier, subject to any potential regulatory restrictions within existing air service memoranda.[21] Second, withholding criteria associated with air-service arrangements, such as strict ownership and control regulations, can be classified as a form of indirect subsidization of air services in that they restrict potential foreign-

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[14] *E.g.*, Brian McDonald, The World Traveling System: The Uruguay Round and Beyond 103 (St. Martin's Press, Inc. 1998).

[15] *Id.* at 100.

[16] *Id.* at 98.

[17] Shane Spradlin, *The Aircraft Subsidies Dispute in the GATT's Uruguay Round*, 60 J. Air L. & Com. 1191, 1194 (1995).

[18] *Id.* at 1201–05.

[19] *See* Table 2 *infra* Part V.

[20] Freedoms of the Air, Int'l Civil Aviation Org., [ICAO] http://www.icao.int/icao/en/trivia/freedoms_air.htm (last visited Feb. 15, 2011).

[21] Nolan, Ritchie & Rowcroft, *supra* note 3, at 368.

designated entrants from starting new services.[22] Third, commercial joint ventures between airlines, airports, and destination marketing organizations are becoming more common. One recent example is the partnership between American Airlines and the Chicago Convention and Tourism Bureau.[23]

A fourth method of subsidization involves direct government subsidy where the goal is to ensure an airline's costs are covered either wholly or in part.[24] In practice, subsidization of commercial air services to preserve accessibility and connectivity is not uncommon. Several examples of direct subsidies for air-service provision can be found, some of which can be traced back to early periods of commercial air transport.[25] In the late 1950s, the International Civil Aviation Organization commissioned a study to investigate the economic implications of long-range jet transport, the results of which noted that:

> Governments may need to reexamine certain aspects of their civil air transport policies in the light of the new situation to decide such questions as the extent to which airlines should be assisted by such means as direct subsidy, or relaxation of taxation measures and policies for charging for the use of airports and air navigation facilities. They may need to review the arrangements by which commercial rights are at present granted, and also to consider the desirability of increasing contributions to technical assistance funds and of participating in new joint financing schemes.[26]

Subsidization can take the form of national public-service policies. Examples designed to ensure air services to remote desti-

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[22] Yu-Chun Chang & George Williams, *Changing the Rules—Amending the Nationality Clauses in Air Services Agreements*, 7 J. AIR TRANSP. MGMT. 207, 208 (2001). A simplified example is Brisbane—Auckland—Rarotonga (BNE-AKL-RAR) services operated by Pacific Blue (AUS) Pty Ltd (although wet leasing aircraft from Pacific Blue Airlines (NZ)). Pacific Blue Airlines (NZ) is effectively controlled in Australia, and thus the BNE-AKL sector is necessary because Australian and international services originating in New Zealand must be operated by airlines with effective control and substantial ownership in New Zealand, given neither have exchanged seventh freedom passenger rights. Similarly, third country carriers operating across the Tasman Sea between Australia and New Zealand do so currently under fifth-freedom routings with either country serving as the beyond or intermediate point.

[23] News Release, Chicago Convention & Tourism Bureau, CCTB/American Airlines Expand Strategic Marketing Partnership (June 18, 2010).

[24] Myron W. Watkins, *The Aviation Industry*, 39 J. POL. ECON. 42, 52–53 (1931).

[25] *Id.*

[26] News Release, L.C. Boussard, Pub. Info. Officer, ICAO, The Economic Implications of Long-Range Jet Air Transportation (Aug. 4, 1958).

nations can be found worldwide, including the United States' Essential Air Services program,[27] Australia's Remote Air Services Subsidy Scheme,[28] and the European Union's Public Service Obligations program.[29] In their comparative review, George Williams and Romano Pagliari found widely varying policies on the application of direct subsidies as public services for air services within Europe, querying whether a more equitable centralization of air service subsidization should be implemented at the level of the European Union rather than through individual member states.[30] Of course, subsidies in air transport in general extend well beyond air-service provision, with perhaps the most publicized example being the alleged protectionist policies of the European community and U.S. government over subsidization of Airbus and Boeing aircraft production.[31]

Subsidization can also function as a policy option for cities or regions that would otherwise not be considered remote from either a connectivity or accessibility perspective. Several recent examples highlight what is likely a growing trend in direct subsidization of service by governments at varying levels.[32] In the United States, AirTran confirmed in June 2009 that its operations out of Wichita Mid-Continent Airport were profitable only as a result of direct subsidies in the amount of $6.5 million from the city, county, and state.[33] Similarly, it was reported in July

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[27] 49 U.S.C. §§ 41732–33 (2007).

[28] *Remote Air Services Subsidy Scheme*, AUST. GOV'T DEP'T OF INFRASTRUCTURE & TRANSP., http://www.infrastructure.gov.au/aviation/regional/rass.aspx (last updated Jan. 10, 2011).

[29] Council Regulation 2408/92, art. 4(1)(a), 1992 O.J. (L 240) 3.

[30] George Williams & Romano Pagliari, *A Comparative Analysis of the Application and Use of Public Service Obligations in Air Transport Within the EU*, 11 TRANSP. POL'Y 55, 60–63 (2004).

[31] Nils Meier-Kaienburg, *The WTO's "Toughest" Case: An Examination of the Effectiveness of the WTO Dispute Resolution Procedure in the Airbus-Boeing Dispute over Aircraft Subsidies*, 71 J. AIR L. & COM 191, 197–205 (2006).

[32] BUREAU OF ECON., ENERGY, & BUS. AFFAIRS, U.S. DEP'T OF STATE, 2009 INVESTMENT CLIMATE STATEMENT – AUSTRALIA (2009); Joel Millman & Mike Esterl, *Air Hubs Pay to Keep their Spokes*, WALL ST. J., July 10, 2009 at A3; Andrew Heasley, *Tiger Claws into Leisure Market—With Government's Help*, THE AGE, June 3, 2010, http://www.theage.com.au/travel/travel-news/tiger-claws-into-leisure-market—with-governments-help-20100603-x25x.html; *Thomas Cook Warns Canaries "Unfair Subsidies to Ryanair: We Could Cut Capacity to the Canary Islands"*, BARCELONA REP., Feb. 24, 2010, http://www.barcelonareporter.com/index.php?/news/comments/thomas_cook_warns_canaries_unfair_subsidiest_o_ryanair_we_could_cut_capacit/; *AirTran Chief Calls Public Money Crucial*, (KSN television broadcast June 24, 2009).

[33] *AirTran Chief Calls Public Money Crucial*, *supra* note 32.

2009 that Portland, Oregon directed a lump-sum subsidy in the amount of $3.5 million to Delta Air Lines to maintain direct links between the city and Tokyo, which were reported to be worth $61.2 million to the immediate region.[34] In Australia, the Victorian government reportedly provided an undisclosed incentive to Tiger Airways Australia (effectively controlled in Singapore[35]) to provide domestic services from Avalon Airport in Melbourne.[36]

In Europe, there has been concern raised over the subsidization of carriers by airports seeking to attract continued or new services.[37] A report from April 2010 revealed the concerns held by distributor and charter airline operator Thomas Cook over discounted aeronautical fees—read by some critics as a subsidy—for the launch of summer 2010 Ryanair services to the Canary Islands from the United Kingdom.[38] Thomas Cook argued that the discounted fees would result in reduced services offered to its own charter operations.[39] This example illustrates how balancing competition against minimum-required access for social-welfare maximization can be a delicate endeavor. European Commission guidelines state that aid for new services should be allowed for a maximum of five years in the case of remote regions.[40]

B. Direct Subsidization of Foreign Airlines

A cost-sharing agreement that captures subsidization can involve the state providing a direct underwrite of services provided by a foreign airline, thus constituting an irregular direct economic subsidy.[41] The conditions necessary for such an underwrite to be applicable exist: (a) when demand for travel along specific origin-destination pairings is not robust enough to war-

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[34] Millman & Esterl, *supra* note 32.

[35] Bureau of Econ., Energy, & Bus. Affairs, *supra* note 32. Australia's domestic market is fully deregulated with respect to ownership and effective control, thus foreign nationals are permitted to own 100% of a domestic carrier, although this is subject to approval from the country's Foreign Investment Review Board.

[36] Heasley, *supra* note 32.

[37] *Thomas Cook Warns Canaries*, *supra* note 32.

[38] *Id.*

[39] *Id.*

[40] 2005 O.J. (C 312) 1, 13; Commission Decision 2004/393, O.J. (L 137). These guidelines arise from a highly publicized case involving Ryanair, Walloon Region, and Brussels South Charleroi Airport.

[41] James Rude, *Direct and Indirect Export Subsidies*, *in* Handbook on International Trade Policy 282–83 (William A. Kerr & James D. Gaisford eds., 2007).

rant entry by a private provider, at least on a continual and profitable basis; and (b) where states may not have sufficient capital to provide even state-owned air services. While the application of utility functions at the level of the state may not be generally feasible,[42] it can be suggested that in instances where direct subsidization of air services as a rational policy instrument is introduced, utility is nonetheless maximized for the sake of national interest.

Consideration should be given to whether subsidies may be considered protectionist. Subsidization of air services may be contentious, given that some markets are effective oligopolies. In thin-market situations, provision of air services is left to one operator operating ostensibly as a monopolist. Barriers to entry may not be entirely insurmountable but are certainly present. Expressed another way, subsidization of air services would be more prevalent in monopoly situations because it is only through direct subsidization of operating costs that profitability is achieved by the monopolist when the absence of subsidization results in marginal costs exceeding marginal revenue. If air-service provision generates positive externalities in the form of increased profits for local businesses, subsidizing an otherwise unprofitable route may improve social welfare.

An exact determination of the optimal subsidy—which depends on the precise nature of demand, production costs, external benefits, and the relative negotiating positions of the state and the monopolist—would require detailed econometric analyses.[43] Necessary data (e.g., airline unit cost and revenue, seat factors) for these types of analyses, however, are often unavailable for commercial reasons. In the absence of this data, we offer guidance on suitable proxies for approaching policy decisions regarding subsidization of an air-service provider.

It is reasonable to assume that thin markets give rise to monopoly market structures given the lack of interest by commercial providers in offering services. Where origin-destination pairings also involve long-distance thin routes, the destination state may have a limited choice of airlines to whom a subsidy could be offered and who are still willing to offer services. The kind of subsidy offered can thus play an important role, and it is possible to develop a hypothetical example of the conditions in-

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[42] ZEEV MAOZ, NATIONAL CHOICES AND INTERNATIONAL PROCESSES 214–15 (Cambridge Univ. Press 1990).

[43] Nolan, Ritchie & Rowcroft, *supra* note 3, at 371.

volved that illustrates the potential difficulty a state faces in establishing an optimum rate of subsidy. In such an example, the profit function for a monopolist as a function of quantity, $\pi(q)$, can be written as $\pi(q) = TR(q) - TC(q)$, where $TR(q)$ and $TC(q)$ denote total revenue and total costs, respectively. Choosing q to maximize profit yields the first order condition $MR(q) = MC(q)$, where $MR(q)$ and $MC(q)$ denote marginal revenue and marginal cost, respectively. The necessary second order condition for profit maximization is that profit at the optimal choices is non-negative, or equivalently, the selling price must be greater than or equal to average production costs, where production costs include opportunity costs.

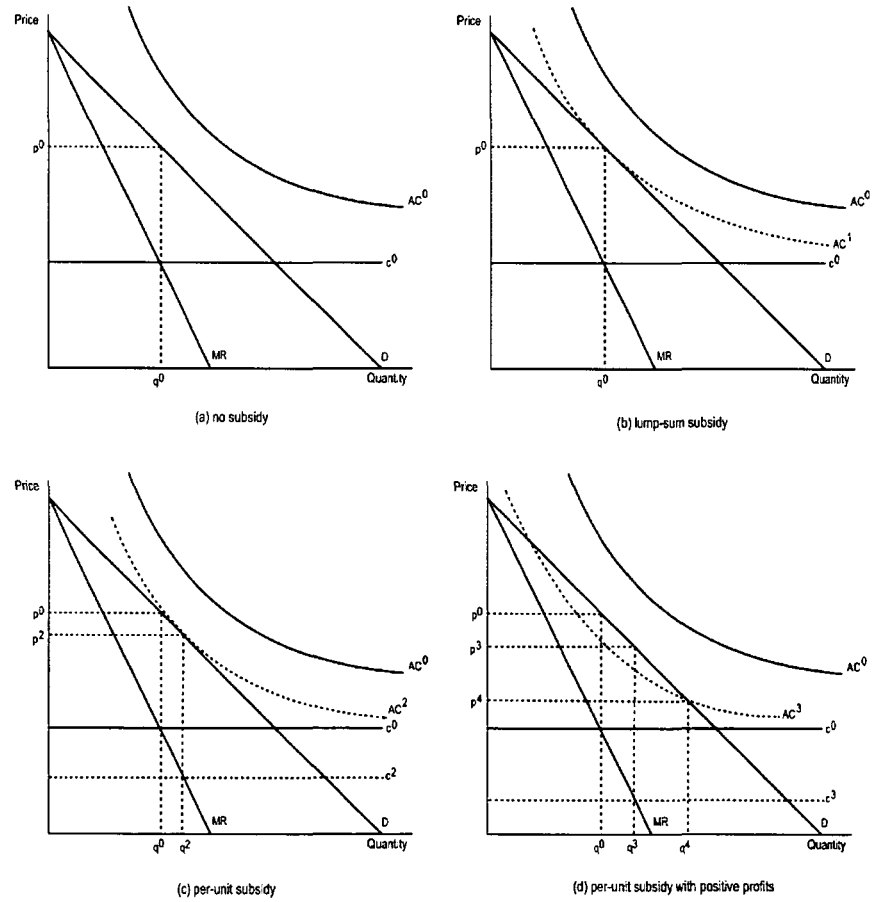

FIGURE 1: SUBSIDIZATION OPTIONS UNDER MONOPOLY CONDITIONS

Monopoly behavior when average cost is greater than demand is described in Figure 1a. For simplicity, we assume that the demand curve (D) is linear and marginal costs (c^0) are constant,[44] but our conclusions are robust to alternative demand and cost specifications. Average production costs are represented by the AC^0 curve. The monopolist will not operate if the average production cost is greater than the price (Figure 1a). A subsidy is therefore required to induce the monopolist to operate. The subsidy may be a lump-sum payment or a per-unit rebate. A lump-sum subsidy will not change marginal costs but will lower average costs to AC^1, as shown in Figure 1b, resulting in the monopolist producing q^0 at price p^0. A per-unit subsidy, on the other hand, lowers marginal costs in addition to reducing average costs. This will induce the monopolist to increase output to q^2, as in Figure 1c.

It would be a coincidence if the per-unit subsidy that maximized state welfare resulted in zero profits when the monopolist is free to choose price and quantity. If the marginal external benefit of increasing the subsidy exceeds the marginal cost to the state, the state will be better served by an output quantity greater than q^2. Such a situation is represented in Figure 1d, where a larger per-unit subsidy results in production at q^3. There are also positive monopoly profits at q^3. If there are subsidy-fueled profits, the state may be able to persuade the monopolist to provide more than q^3. The eventual outcome would depend on the negotiating power of the monopoly operator and state. While we noted earlier that state subsidy of carriers in thin-market situations would generally feature the potential presence of one carrier, the fact that the state is incentivized to provide a subsidy to a single carrier for the purposes of maximizing social welfare could mean that other carriers may be willing to participate on the route or in the sector. In this case, if there are many airlines to which the state could potentially offer the subsidy, the state could dictate that the monopolist provides q^4. On the other hand, if one airline can service the route at significantly lower costs than other airlines, the outcome will be close to q^3. In either case, if the state is able to command the quantity produced, it is irrelevant whether a lump-sum or a per-unit subsidy is offered as the quantity provided is no longer determined

[44] Logically, the addition of new aircraft in air service provision would cause marginal costs to increase sharply.

by the monopolist equating marginal revenue and marginal-production costs.

IV. PUBLIC SUBSIDIES: A PACIFIC ISLANDS EXAMPLE

As an example of cost sharing in the form of a public subsidy, and the resultant policy considerations that this brings, this section critically examines a recent cost-sharing agreement, reported as a "risk-share," between Air New Zealand and the government of the Cook Islands. For comparison, discussion also centers on direct subsidization of air services as a policy instrument identified by the government of New Zealand with respect to other Pacific Island states. To begin, it is important to situate the available connections from Rarotonga (RAR) to the United States. Air Rarotonga services neighboring islands using commuter aircraft (Saab 340, EMB110) but code shares with Air Tahiti (VT) using a VT-registered ATR 72-500 for twice-weekly RAR-Papeete services.[45] From Papeete, Air Tahiti Nui operates daily A340-300 services to Los Angeles (LAX).[46] Air New Zealand operates weekly on the RAR-LAX route using a 767-300 in a J24 Y210 configuration.

The *Cook Islands News* reported in September 2008 that the existing year-old cost-sharing agreement between the Cook Islands government and Air New Zealand—valued at NZ$2.9 million—for the provision of non-stop LAX-RAR-LAX services was being reconsidered and faced possible cancellation.[47] A renewed agreement called for a NZ$5 million lump sum subsidy from the Cook Islands government in order to ensure continuation of services.[48] The agreement was ratified in November 2008 with effect from April 2009.[49] From the perspective of the Cook Islands, there is high value in non-stop LAX-RAR flights.[50] The routing provides direct connectivity and reduces time factors in access to visitors from North America.[51] European visitors also

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[45] *Our Aircraft Fleet*, AIR RARONTONGA, http://www.airraro.com/clientpages/raro/fleet.html (last visited Feb. 24, 2011).

[46] AIR TAHITI NUI, http://www.airtahitinui-usa.com (last visited Feb. 24, 2011).

[47] Helen Greig, *Weekly LA Flight Likely to Stop*, COOK ISLANDS NEWS, Sept. 27, 2008, at 1.

[48] Yvonne Tahara, *Cooks Pays Air NA $5M to Keep Rarotonga Route*, N.Z. HERALD, Nov. 25, 2008, http://www.nzherald.co.nz/nz/news/article.cfm?c_id=1&objectid=10544850.

[49] *Rarotonga Backs Subsidy to Air NZ*, STUFF.CO.NZ, Nov. 28, 2010, http://www.stuff.co.nz/business/738867; Tahara, *supra* note 48.

[50] *See generally Rarotonga Backs Subsidy to Air NZ*, *supra* note 49.

[51] *See id.*

utilize transfers at LAX to the direct service.[52] Visitation statistics demonstrate this raw importance with approximately 4,300 arrivals from the United States in 2007 (see Table 1) with an average length-of-stay of ten days.[53]

Year	New Zealand	United States	Australia	Total
2003	30921	7630	11470	78328
2004	38755	6026	11850	83333
2005	49088	4434	11313	88405
2006	51841	5476	11470	92351
2007	58931	4343	12445	97077

TABLE 1. ARRIVALS BY COUNTRY OF RESIDENCE - COOK ISLANDS

In a recent article, Tim Hazledine and Stephanie Collins state that air services to many Pacific Islands carry passengers for whom any singular island nation is not the sole destination. Such multi-destination travel is provided by attractive fare structures and marketing efforts in key markets.[54] Removal of the LAX-RAR-LAX service would essentially remove Cook Islands' actual and perceived accessibility and connectivity. Thus, for those passengers who travel on Star Alliance Circle Pacific (branded multi-stop itineraries) or round-the-world routings, the existence of the service means that a stop in RAR is possible. Visibility on the network is thus critical. For the purposes of this article, the economic rationale for the risk-share agreement can be explored further in order to understand the political environment that frames the agreement itself.

First, some assumptions must be made regarding the variable cost structure—contributing to overall CASK (cost per available seat kilometer)—of Air New Zealand operations on the route. Specifically, it is feasible to assume that Air New Zealand could well have faced LAX-RAR-LAX operations with average total costs sitting above market demand for the service.[55] Around the

[52] *Id.*

[53] COOK ISLAND TOURISM CORP. & N.Z. TOURISM RESEARCH INST., AUKLAND UNIV. OF TECH., COOK ISLANDS TOURISM VISITOR SATISFACTION & IMPACT MONITOR 3 (2007); COOK ISLANDS STATISTICS OFFICE, *Tourism Statistics: Visitor Arrivals by Country of Usual Residence,* http://www.stats.gov.ck/Statistics/Tourism/tourism_ctyofresid.htm (last visited Feb. 16, 2011).

[54] Tim Hazledine & Stephanie Collins, *Paying the Pilot? The Economics of Subsidising International Air Travel to Small Remote Island Nations with Large Diaspora,* 17 J. AIR TRANSP. MGMT. 187, 192 (2011).

[55] *See supra* Figure 1a. As indicated previously, the lack of reliable data—for commercial reasons—prevents meaningful analysis of the exact operational posi-

time it was reported that the existing year-old risk-share agreement was being reconsidered,[56] it is reasonable to speculate that Air New Zealand would have likely been facing increasing variable direct-operating costs (the price of jet fuel being a significant contributor, if not directly, then through hedging contracts) such that demand on the route could not cover costs in the short-run. Again, commercial confidentiality prevents an empirical test of these assumptions; however, it is reasonable to conclude that the unstable jet-fuel prices would have created an uncertain operating environment in the short-term and, thus, rendered a joint cost-sharing agreement an acceptable solution toward mitigating uncertainty.

Second, while technically not offering monopoly RAR-LAX services (in that other services are possible, save for potentially significant sunk costs), Air New Zealand holds substantial market power that roughly resembles a monopoly.[57] While it cannot properly be considered a *de jure* monopoly given that there is no legal basis for attributing air services to one carrier servicing international routes to and from RAR (even with the cost-sharing agreement in place, although this is admittedly purely speculative), the agreement essentially enhances state-sanctioned monopolist activities to the point where competitors may be reluctant to initiate services.

Third, and from a government policy perspective, we can identify several choices available to the government of the Cook Islands: (1) accept the uncertainty of access and connectivity by disengaging the existing cost-sharing agreement; (2) re-engage with a previously established cost-sharing agreement, subject to negotiation of amounts and conditions; and (3) seek other access options via other carriers.

Proceeding with a re-engagement of the cost-sharing agreement would allow for some degree of certainty in service provision to the Cook Islands from the United States. The alternatives would have presented the Cook Islands with the prospect of no guaranteed access to the lucrative U.S. market.[58] For example, there was a report in the *Cook Islands News* in late September 2008 that Canadian carrier WestJet may have been interested in a flight via Honolulu, although this was not at all

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tion of Air New Zealand around the time the original "risk-share" agreement had expired. *See supra* Part III.B.

[56] Greig, *supra* note 47.

[57] *See* Tahara, *supra* note 48.

[58] *See* Greig, *supra* note 47.

certain.[59] The CEO of Cook Islands Tourism Corporation (CITC) indicated that the LAX-RAR flight accounts for 19,000 international long haul visitors.[60] Spend data available for Cook Islands visitors is limited, although a study conducted by the New Zealand Tourism Research Institute at Auckland University of Technology, based on a survey of approximately 800 visitors, revealed that the majority of international (non-New Zealand) visitors stayed between one and fourteen days.[61] North American and European visitors, with a small sample base in the research, are estimated to spend NZ$190 and NZ$201 per day, respectively.[62] Press surrounding the cost-sharing agreement in November 2008 has the CITC quoting an average NZ$200 spent per visitor per day, although it is not unreasonable to assume that a substantial proportion of this figure includes accommodation and transportation.[63] Comments attributed to the CEO of the CITC in the press put the value of tourism to the Cook Islands at NZ$33 million, which includes the value of tourist expenditure plus revenue incurred through port departures and arrivals.[64]

Several unknowns surround the Cook Islands–Air New Zealand agreement, many of which will likely remain as such owing to commercial confidentiality.[65] Caution must be used when analyzing cost-sharing agreements from which primary data is not easily available. First, it is not clear whether the subsidized amount fluctuates with load factors, yield, or even standard revenue-passenger-kilometer measures. In other words, it is not clear whether the subsidy covers the total cost of Air New Zealand's operations, whether there exists perhaps a minimum load factor per sector or across a specific time frame, or whether there is an explicit revenue guarantee where "top-ups" are provided to a particular threshold.[66] Second, it is not clear whether the agreement ties Air New Zealand operations to the use of a specific gauge (in this case, a B767) and, by extension, whether provision was made for a pro rata reduction in subsidy should Air New Zealand choose to operate more fuel-efficient aircraft

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[59] *Id.*

[60] *Rarotonga Backs Subsidy to Air NZ*, *supra* note 49.

[61] COOK ISLANDS STATISTICS OFFICE, *supra* note 53, at 3, 9–10.

[62] *Id.* at 21.

[63] *Rarotonga Backs Subsidy to Air NZ*, *supra* note 49.

[64] *Id.*

[65] *See supra* Part III.B.

[66] Nolan, Ritchie & Rowcroft, *supra* note 3, at 365–66.

on the route. Finally, it is not clear whether the subsidy is tied to jet-fuel prices; if not, it can only be speculated whether Air New Zealand priced the value of the service on the basis of the rather substantial jet-fuel prices from 2008.[67]

V. IMPLICATIONS FOR ACCESS POLICY

As discussed above, access and connectivity are closely aligned with economic development. The 2007 IATA brief discussed above noted that the economic value of connectivity from aviation helps drive productivity and overall economic development.[68] Exports, both hard goods and services such as tourism, are clear beneficiaries of air access. Selim Ach and Brian Pearce assessed the competitiveness of travel and tourism and found that air transport infrastructure, including quantitative and qualitative measurements, infrastructure quality, available-seat kilometers, departures per 1,000 residents, airport density, the number of operating airlines, and network quality were important predictor variables.[69] This is amplified for remote destinations that rely almost entirely on air access for visitor arrivals. Cost sharing thus becomes an attractive solution to problems of access, particularly when routes and sectors are commercially nonviable. Some primary policy responses available to destinations keen on retaining or attracting air services that may be nonviable in an open market are summarized in Table 2.

Regardless of policy responses, there exist several implications, all of which are framed by the state's desire to retain or enhance relative access and connectivity. The first implication relates to the role of cost-sharing agreements in wider policies on access in relation to economic development goals. As air access is often associated with tourism as an export-earning activity, cost shares can become an indirect subsidy of tourism, and issues of opportunity cost and net social welfare arise as a result.[70] The specific terms and conditions of the cost share would need to seriously consider several economic variables in an overall cost-benefit analysis. Indeed, the shape of the market (as-

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[67] *See* Jeff Bailey, *Fuel Costs Just Part of Airlines' List of Woes*, N.Y. TIMES, Apr. 10, 2008, at C1.

[68] Smyth & Pearce, *supra* note 12.

[69] Selim Ach & Brian Pearce, *How Well Does the Travel & Tourism Competitiveness Index Explain Differences in Travel Intensity Among Countries?*, *in* THE TRAVEL & TOURISM COMPETITIVENESS REPORT 2009, at 55, 60 (Jennifer Blanke & Thea Chiesa eds., 2009).

[70] *See, e.g.*, *Rarotonga Backs Subsidy to Air NZ*, *supra* note 49.

No subsidy	**Advantages**: Competition possible if favourable market conditions exist. **Disadvantages**: Patchy, seasonal, and generally sporadic air services, possibly provided by foreign carriers; Limited network linkages and connectivity; Potential for nonviable services in the long-term, causing incumbent carrier(s) to exit market
Cost-share (underwrite)	**Advantages**: Assurance of access. **Disadvantages**: Potential for some conditions to be levied by airline that would require additional resources (i.e., marketing); Market shape altered (opportunity cost of lost competition).
Joint venture	**Advantages**: Assurance of access through joint marketing and promotional programmes, thus ensuring consistency of messaging. **Disadvantages**: Extensive consultation with wider policy community, public governance structures, and private stakeholders could create delays.

TABLE 2: POLICY LEVERS AND POTENTIAL OUTCOMES

suming a market model) is potentially affected significantly if access privilege is vested with a single carrier as a result of a cost-share.[71]

The second implication relates to sources of funding. Cost shares need not be overt underwrites—however transparent—of existing or new air services.[72] They can take other, more strategic forms.[73] Examples include joint advertising budgets and campaigns and the inclusion of multiple stakeholders in a cost-share agreement.[74] For instance, a joint-destination advertising campaign can include partners such as a local airport, the local government, and the destination marketing organization, in addition to a specific airline.[75] These reflect dynamic and flexible partnership configurations and arrangements between multiple stakeholders, including airports, destination marketing organizations, and airlines.

The third implication relates to *post hoc* policies governing revision and monitoring. Econometric analyses can assist in the modeling of passenger movement relative to independent vari-

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[71] *See id.*

[72] Nolan, Ritchie & Rowcroft, *supra* note 3, at 365–66; Millman & Esterl, *supra* note 32, at A3.

[73] Nolan, Ritchie & Rowcroft, *supra* note 3, at 365–66; Millman & Esterl, *supra* note 32.

[74] Nolan, Ritchie & Rowcroft, *supra* note 3, at 365–66; Millman & Esterl, *supra* note 32; *Rarotonga Backs Subsidy to Air NZ*, *supra* note 49.

[75] *See, e.g.*, *Rarotonga Backs Subsidy to Air NZ*, *supra* note 49.

ables that are seen to exert influence,[76] yet caution must be exercised in that there would not exist a meaningful control group that would assist in measuring the impact of a cost-share arrangement. In remote destinations where air services are essential, this is somewhat easier to track given that the cessation of air services can effectively mean a drastic drop in arrivals.[77]

VI. THE FUTURE OF COST-SHARE ARRANGEMENTS

It is plausible that more air-service provisions could become subsidized publicly in the near future in those states where spatial accessibility or connectivity is limited and, thus, of limited attraction for private providers. There are several reasons for this. First, it is commonly known that commercial airlines became increasingly risk averse during the 2008 and 2009 global recession.[78] Decisions relating to markets served are thus influenced by access to limited capital and financing options as well as rapidly shrinking demand due to depressed economies in key markets that comprise otherwise profitable inbound and outbound traffic flows. Carriers also face uncertain unit costs in the immediate future, whether through long-run marginal cost increases due to high costs of capital or fuel hedging losses. Those states with limited accessibility and connectivity will be most at risk as trading conditions continue to deteriorate. Although industry-wide conditions show some signs of improvement for 2010,[79] it is likely that some states will need to monitor carefully the financial viability of their existing air-service provision, especially where provided by foreign carriers, and assess whether such services are in jeopardy.

Second, and related, most geographically-separated countries globally rely on services from providers that are not designated as national carriers.[80] Cases that are especially vulnerable are those where carriers provide services within thin market origin-destination pairs—when demand from an origin may be depressed due to economic reasons, supply at the destination is limited due to size and developmental factors, or both. Indeed, several islands in the Pacific Region fall under this category. As

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[76] *See, e.g., id.*; *Subsidy Increase, Direct Flight to LA to Continue*, COOK ISLANDS TIMES WKLY., Nov. 25, 2008, http://www.ciherald.co.ck/articles/t278e.htm.

[77] *See Rarotonga Backs Subsidy to Air NZ*, *supra* note 49.

[78] *See, e.g.*, Millman & Esterl, *supra* note 32.

[79] Nicola Clark, *Trade Group Sees Profit in '10 for Airlines as a Whole*, N.Y. TIMES, June 7, 2010, at B5.

[80] *See supra* notes 1–5 and accompanying text.

discussed above, the cost-sharing agreement between Air New Zealand and the Cook Islands government emulates in principle access-assurance programs in other parts of the world.[81]

Owing to market uncertainties and challenges to cost and yield by many airlines worldwide, it is reasonable to surmise that the raw number of cost-share arrangements, in a variety of formats, could increase. Where they are inevitable due to apparent commercial non-viability, consideration must be given to the protectionist nature of the public subsidization of air-service provision as national policy. While protectionist measures do not necessarily align with liberal policies toward trade and investment including air transport, it can be argued that less-connected destinations—cities, regions, or entire states—may need to utilize direct subsidization to protect air access and maximize national welfare when existing market conditions do not warrant profitable unsubsidized services. In some cases, the level and type of subsidy, whether per seat or lump sum, may well depend on the structure of the market and, as noted, the bargaining power of both parties.

Finally, it is important to note that air-service provision may also fall within wider development-aid programs as manifested between developed and developing countries.[82] In the case of the Pacific Islands, the New Zealand Prime Minister indicated in March 2009 that subsidization, through direct New Zealand government underwriting, of air services to nation states such as Tonga and Samoa is generally consistent with foreign-aid policy.[83]

VII. CONCLUSION

Economic theory suggests that those states with smaller or weaker factors of production are more likely to engage in policies that favor the subsidization of what would be seen as essential economic services.[84] Direct public subsidization would thus be used to correct market failure and imbalances.[85] This article

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[81] *See supra* Part IV.

[82] *E.g., New Zealand Government to Support Tonga and Samoa with Air NZ Services*, PAC. BUS. ONLINE, Mar. 10, 2009, http://www.pacificbusinessonline.com/new-zealand/story/13293/new-zealand-government-support-tonga-and-samoa-air-nz-services.

[83] *Id.*

[84] Baldev Raj Nayar, *Regimes, Power, and International Aviation*, 49 INT'L ORG. 139, 144 (1995).

[85] *See supra* Part III.B.

has provided an overview of the economic efficiency, from a social-welfare perspective, of public and private risk-sharing agreements in air-service provision. It argued that term-limited *ex ante* public and private cost-share agreements, not entirely dissimilar to the Air New Zealand–Cook Islands example discussed above, may represent a move toward more permanent subsidization by states of air-service provision in uncertain economic environments and where private investment is either reduced or unlikely.

From a policy response perspective, states may follow one or more of the potential levers outlined herein, but on the assumption that adequate and reliable data are available, there is a need to undertake a full cost-benefit analysis and wider econometric studies in order to justify the policy before implementation. We have argued throughout that in periods of economic instability there is greater scope for states to seek means of access assurance, of which cost sharing is but one example.

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